US Army Corps
of Engineers®
Albuquerque District

DRAFT
ENVIRONMENTAL ASSESSMENT

for the

SECTION 595 WATER RESOURCES DEVELOPMENT ACT

Pueblo of Zuni Constructed Wetlands Wastewater Treatment Lagoons, McKinley County, NEW MEXICO

Prepared by

U.S. ARMY CORPS OF ENGINEERS
ALBUQUERQUE DISTRICT
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109

April, 2008

Finding of No Significant Impact
Section 595 Water Resources Development Act
Wastewater Collection System Improvements
Pueblo of Zuni, New Mexico

The U.S. Army Corps of Engineers (Corps), Albuquerque District, in cooperation with and at the request of the Pueblo of Zuni, New Mexico, is planning a project to increase the capacity of the Zuni secondary wastewater treatment wetlands. The construction work is authorized under Section 595 of the Water Resources Development Act of 1999 (Public Law 106-53; 33 U.S.C. 2201 *et seq.*), as amended. The Act authorizes the Corps to provide assistance for design and construction for water-related environmental infrastructure and resource protection and development projects in Idaho, Montana, rural Nevada, New Mexico, and rural Utah. The Pueblo of Zuni is the local sponsor. The proposed construction period for the first two wetland cells is nine months, and is expected to start in September 2008.

The proposed action involves the construction of ten additional secondary treatment wetland cells to meet the design capacity of 12 wetland cells total within a 200-acre fenced area on Zuni Pueblo land. Two cells would be constructed initially, and future cells would be added as funding becomes available. The two wetland cells proposed for initial construction in 2008 would be located immediately northwest of two existing wetland cells that were constructed in 2001. These initial two cells would provide the greatest capacity for wastewater treatment given the available budget. The completion of the ten additional wetland cells would provide the Pueblo with wastewater treatment capacity sufficient for effluent disposal given the current population and conditions while addressing existing deficiencies. The entire Pueblo of Zuni would benefit from the proposed expansion of the secondary treatment wetlands.

Cultural resources surveys of the project area were conducted in 1999 and 2000, when the U.S. Environmental Protection Agency was the lead Federal agency for this project. Archaeological and traditional cultural properties reports were prepared by Zuni Cultural Resources Enterprise (ZCRE) and reviewed by the New Mexico State Historic Preservation Officer (SHPO). Of the 10 archaeological sites that were recorded, nine are eligible to the National Register of Historic Places under criterion “d”. The strategy proposed by ZCRE was to avoid impacts to the sites through a combination of restricting construction in certain locations, fencing, and monitoring during construction. The recommendations in the report were concurred with by SHPO. The Corps would adhere to the recommendations in the ZCRE report; therefore, the Corps has determined that there would be "No Historic Properties Affected" by construction of the project.

The potential environmental effects of the proposed action are minimal compared to the No-Action alternative, with the difference being that the No-Action alternative does not provide sufficient capacity to accommodate existing wastewater flows. The deficiency of the existing system forces incompletely treated effluent to be discharged on land near the Zuni River. By eliminating discharge of incompletely treated effluent on land near the Zuni River, the proposed action has a net environmental benefit.

The proposed work would not affect waters of the United States regulated by Section 404 of the Clean Water Act; therefore a Section 404 Department of the Army permit would not be needed for the project. The proposed construction of the wetland lagoons would occur outside the floodplain and would not significantly alter any use or natural feature of the area. Therefore, the planned action is consistent with Executive Order 11988 (Floodplain Management). The proposed work complies with Executive Order 11990 (Protection of Wetlands) as wetlands are increased within the project area.

Pursuant to Section 402 of the Clean Water Act, a Storm Water Pollution Prevention Plan (SWPPP) is required for this project under National Pollution Discharge Elimination System general permit guidance. Best management practices to control storm water discharges, dust, and emissions from construction vehicles would be incorporated into the contractor's SWPPP and Environmental Protection Plan.

Only short-term, minor adverse impacts to aesthetics, soils, air, noise, vegetation, and wildlife, would occur during construction. No long-term impacts would occur to climate, air, special status species, floodplains, socioeconomics, environmental justice or cultural resources. Minor beneficial impacts would occur to human health and safety and wetlands. Minor long-term impacts would occur to soils and land use by converting an open field to wetlands. The proposed project would not result in any moderate or significant, short-term, long-term, or cumulative adverse effects.

The planned action has been fully coordinated with federal, state, tribal, and local agencies with jurisdiction over the ecological, cultural, and hydrological resources of the project area. Based upon these factors and others discussed in detail in the Environmental Assessment, the planned action would not have a significant effect on the human environment. Therefore, an Environment Impact Statement will not be prepared for the proposed construction of the Zuni secondary treatment wetland cells.

_____ _____

Date

B.A. Estok
Lieutenant Colonel, U.S. Army
District Commander

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Background and Location	1
	1.2 Purpose and Need	1
	1.3 Regulatory Compliance	6
2.0	PROPOSED ACTION AND ALTERNATIVE	6
	2.1 Proposed Action	7
	2.2 Alternatives Considered	7
	2.3 Future without project (No-Action)	7
3.0	EXISTING ENVIRONMENT AND FORESEEABLE AFFECTS	8
	3.1 Physiography, Geology, and Soils	8
	3.2 Climate	8
	3.3 Water Quality	9
	3.4 Floodplains and Wetlands	9
	3.5 Air Quality, Noise, and Aesthetics	10
	3.6 Vegetation Communities	11
	3.7 Wildlife	11
	3.8 Special Status Species	12
	3.9 Cultural Resources	15
	3.10 Land Use and Socioeconomic Considerations	17
	3.11 Indian Trust Assets	18
	3.12 Human Health and Safety	18
	3.13 Environmental Justice	18
	3.14 Noxious Weeds and Invasive Species	19
	3.15 Cumulative Impacts	19
4.0	CONCLUSION AND SUMMARY	20
5.0	PREPARATION, CONSULTATION AND COORDINATION	20
	5.1 Preparation	20
	5.2 Quality Control	20
	5.3 General Consultation and Coordination	21
6.0	REFERENCES CITED	22

APPENDICES

Appendix A	Cultural Resources Coordination
Appendix B	Biological Resources Coordination
Appendix C	Public Review Comments
Appendix D	Zuni Pueblo Wetland Project Plans

TABLE OF CONTENTS (Cont.)

Page

LIST OF FIGURES

Figure 1. Vicinity Maps of Proposed Project Area for the Wastewater Collection System Improvement, Pueblo of Zuni, McKinley County, New Mexico. 3

Figure 2. Location of Proposed Secondary Treatment Lagoons, Pueblo of Zuni, McKinley County, New Mexico. 4

Figure 3. Site Visit Photo of Proposed Project Area Looking North 5

LIST OF TABLES

Table 1 Federal and State of New Mexico's Special Status Species with Potential to Occur at Proposed Project Site 13

Table 2 Rare, Threatened and Endangered Plant Species Listed for McKinley County, NM 15

1.0 INTRODUCTION

1.1 Background and Location

The United States Army Corps of Engineers (Corps), Albuquerque District, in cooperation with, and at the request of the Pueblo of Zuni, New Mexico, is planning to construct ten additional wetland/evaporation cells for secondary and tertiary wastewater treatment. The proposed cells are needed to increase the capacity of the wetlands wastewater treatment to design capacity.

The work would be conducted under Section 595 of the Water Resources Act of 1999 (Public Law 106-53) as amended. The Act authorizes the Corps to provide assistance in the form of design and construction for water-related environmental infrastructure, resource protection, and development projects in Idaho, Montana, rural Nevada, New Mexico, and rural Utah. Types of projects included under the Act are: wastewater treatment and related facilities, stormwater retention and remediation, surface water resource protection and development, and sewer and water line replacement.

Provisions under the Act require that the project be publicly owned to receive Federal assistance. As such, the non-Federal sponsor for the proposed project is the Pueblo of Zuni, New Mexico. The Act further requires that a cooperative agreement be established between the Federal and non-Federal interests. In general, the Federal share of project costs under each cooperative agreement is 75 percent of the total project cost.

The proposed project area is located within the Pueblo of Zuni lands, McKinley County, New Mexico (see Figures 1 and 2). The site is south of the Zuni River and north of Ojo Caliente Road, approximately 2.5 miles southwest of the Pueblo of Zuni Village. This approximately 200-acre area is currently an open field with upland vegetation and two constructed wetland cells (see Figure 3). The proposed construction period for the first two new cells is nine months and is expected to start in September 2008. Future cells would be constructed as funding becomes available.

1.2 Purpose and Need

The purpose of this project is to add ten additional constructed wastewater treatment cells to the Pueblo of Zuni wetlands secondary and tertiary treatment area ("Zuni wetlands project area" shown in Figure 2). The design of the wetlands is for twelve treatment cells total to provide enough evaporative capacity to prevent overflow. The first phase of this project will provide two cells in addition to two that were constructed previously, for a total of four. As additional funds become available, more cells will be constructed until the design capacity of twelve cells is reached.

The existing primary and secondary treatment facility consists of a six-cell facultative lagoon system with a total surface area of 33.4 acres ("Existing primary treatment lagoons" shown in Figure 2). The first four of these lagoons were constructed in 1969 and the remaining 2 in 1971 by the Indian Health Service. No significant improvements have been made to the

lagoons since 1971. The Indian Health Service funded a project in 2004 for $424,000.00 to rehabilitate and provide improvements to this system. This project proposes to clean out accumulated sludge, rebuild broken berms, replace valves between cells, repair fencing, and conduct effluent quality monitoring. As of this date, this project has not been constructed.

A lift station was funded by the U.S. Environmental Protection Agency (USEPA), State of New Mexico and the Pueblo of Zuni. An Environmental Assessment and FONSI were completed August 20, 1998 (USEPA 1998). This project to pump effluent from the treatment lagoons to the wetlands was completed in June 2003. The 10-inch effluent line from the lift station to the wetlands was completed in 2001. The two existing constructed wetland cells were constructed by in-house personnel of the U.S. Bureau of Reclamation in 2002. The Zuni Fish and Wildlife Department is presently operating and maintaining the two existing cells.

In June 2005, a wastewater treatment study was completed for the Pueblo of Zuni. This study recommends that, in coordination with the Indian Health Service Project, the middle two primary treatment lagoons be deepened with aerators installed and serpentine channels with appropriate vegetation be constructed in the lower two cells. The upper two cells would be used as receiving and settlement cells with monitoring inlet devices. Sludge drying beds were recommended to be provided near the treatment lagoons for future sludge removal. Although not part of the current project, these recommendations would improve the quality of effluent entering the secondary/tertiary treatment wetlands. The 2005 report also recommends the continuation of construction of cells in the constructed wetlands to design capacity.

The most significant health issue related to the wastewater treatment system is that of the intermittent overflow from the wetlands system. The overflow occurs when atmospheric conditions slows the evaporation rates and/or during peak usage. At this time, no residences are located near or down stream of the facilities. The overflow is overland and may migrate to the Zuni River approximately 1800 feet north of the existing lagoons. The Zuni River is an intermittent stream and only flows during heavy rainfall or from an unusually heavy snow pack. The only known human interaction with the wastewater would be down stream on the Zuni River in Arizona.

The wastewater system for Pueblo of Zuni lacks the capacity to adequately treat the amount of wastewater generated at its present population. The Tribe’s population is growing at a rate of 2.2% per year. The Tribe has managed to construct components of the planned treatment system but has fallen behind in treating the amount of wastewater generated. Therefore, the tribe is in desperate need of assistance to fund the construction in phases to complete the planned system.

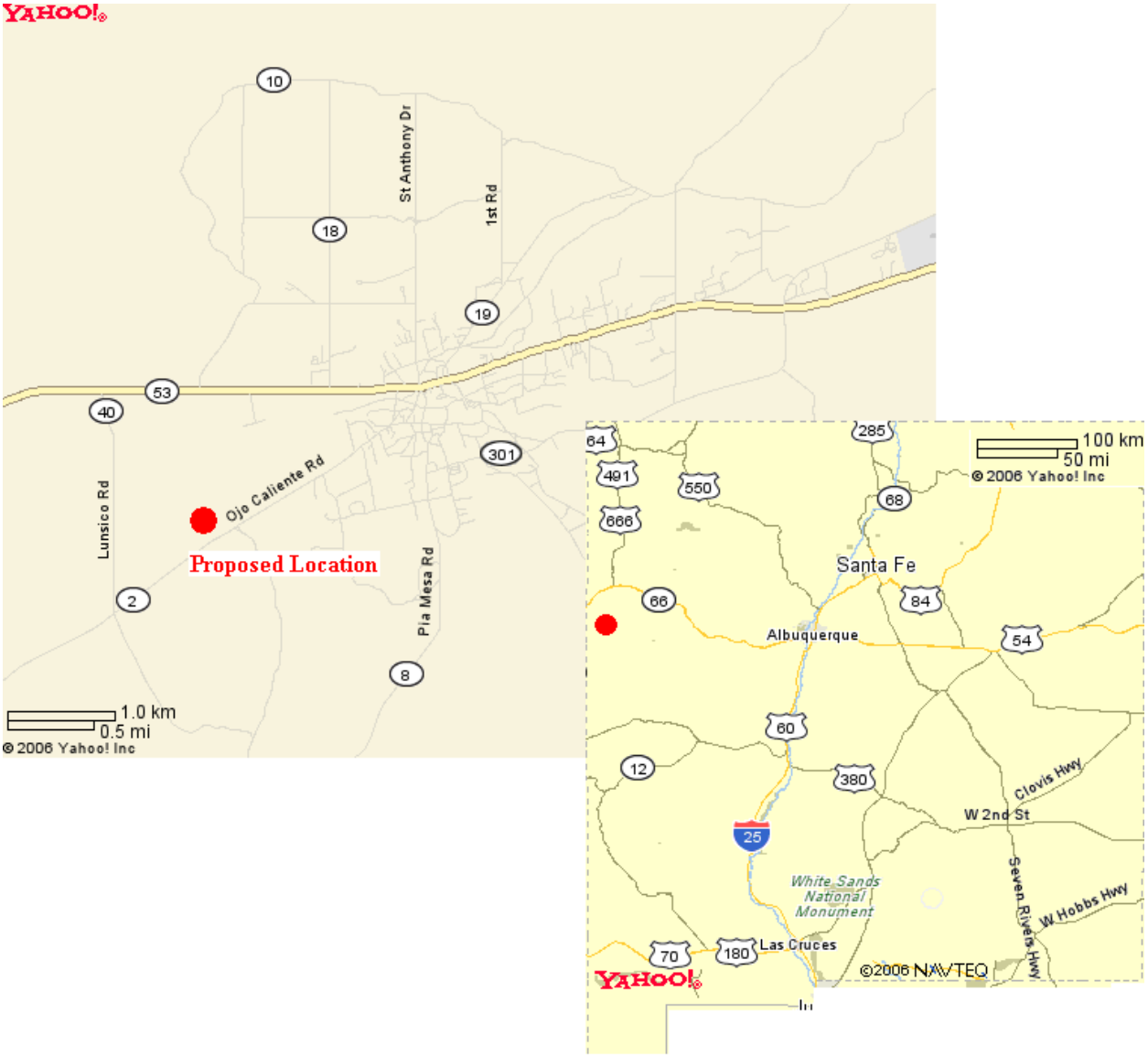


Figure 1. Vicinity Map of Proposed Project Area for the Wastewater Collection System Improvement, Pueblo of Zuni, McKinley County, New Mexico.

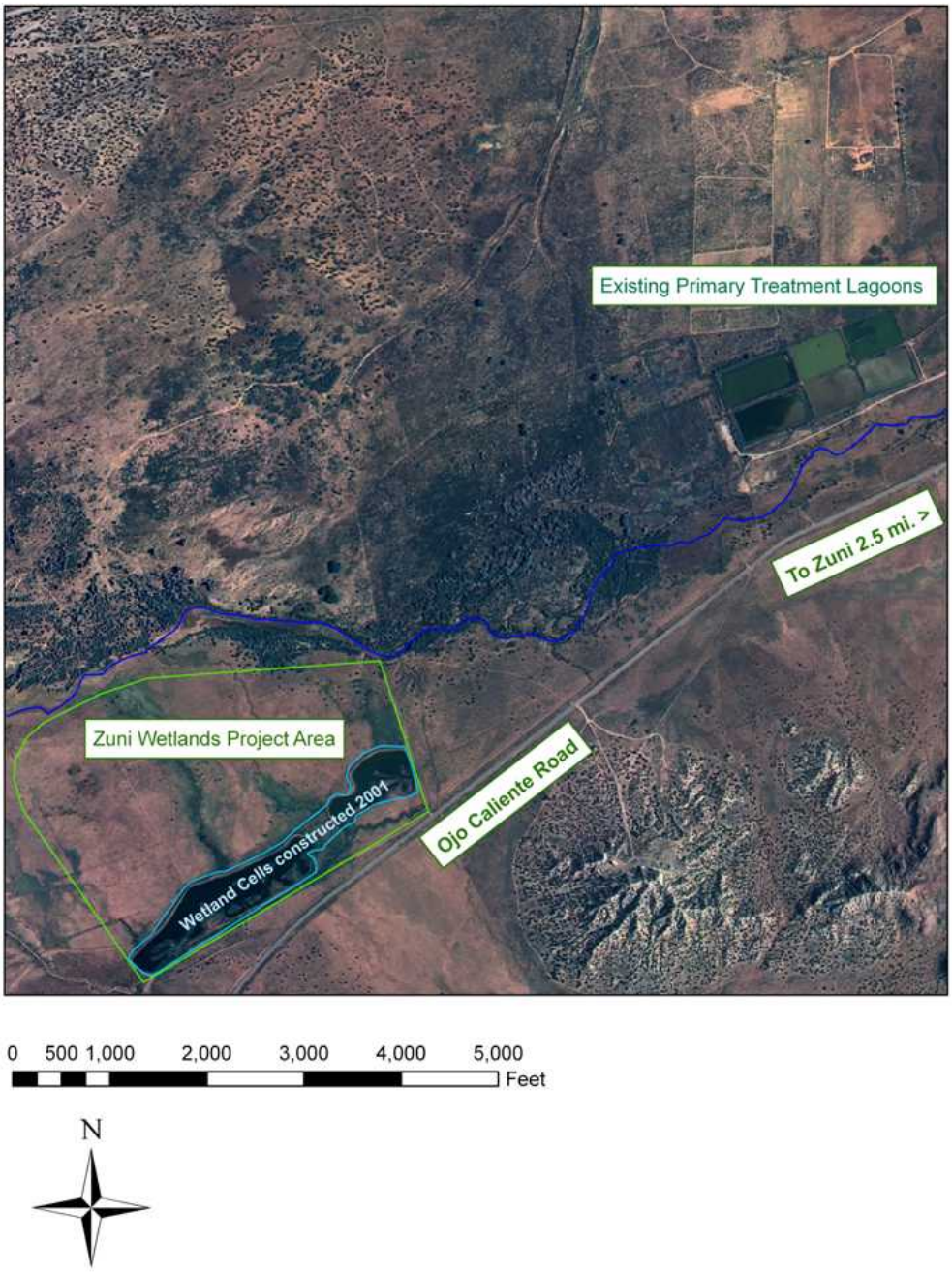


Figure 2. Location of Proposed Secondary Treatment Lagoons, Pueblo of Zuni, McKinley County, New Mexico

Figure 3. Proposed Project Area Looking North

1.3 Regulatory Compliance

This Draft Environmental Assessment was prepared by the Corps, Albuquerque District, in compliance with all applicable Federal Statutes, Regulations, and Executive Orders, including the following:

- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Clean Water Act of 1972 and Amendments of 1977(CWA)
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, 1994
- Floodplain Management (Executive Order 11988)
- National Environmental Policy Act of 1969, as amended (42 U.S.C 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- Procedures for Implementing NEPA (33 CFR 230; ER 200-2-2)
- U.S. Army Corps of Engineers' Procedures for Implementing NEPA (33 CFR 230)
- Farmland Protection Policy Act of 1981, as amended (7 U.S.C. 4201 *et seq.*)
- Executive Order 13112, Invasive Species
- Noxious Weed Act of 1974 (PL93-269; 7 U.S.C. 2801)

This Draft Environmental Assessment also reflects compliance with all applicable State of New Mexico and local regulations, statutes, policies, and standards for conserving the environment such as water and air quality, endangered plants and animals, and cultural resources.

2.0 DESCIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Zuni Pueblo has an existing collection system delivering wastewater to six primary treatment lagoons. After the primary treatment process is completed, the outflow is pumped approximately one mile to the secondary process wetland/evaporation cells. Currently, there are two secondary treatment wetland cells (shown as cells 1 and 2 on p. C-01 of Appendix D), which were constructed in 2001, located within a fenced 200-acre site. The construction of these two cells was the result of a facilities plan prepared by Molzen-Corbin & Associates. In 2000, the Zuni Pueblo hired Molzen-Corbin & Associates to make improvements to their wastewater

collection system. Subsequently, Molzen-Corbin & Associates prepared the "Pueblo of Zuni Wastewater Treatment and Disposal Facilities Plan (Molzen-Corbin & Associates 1997a) and the accompanying "Lagoon Renovation and Wetland Project- Zuni Wetland Phase" Plan (Appendix D is excerpted from this plan), which identifies the 200-acre site as the location for 12 wetland/evaporation cells. As their budget allows, Zuni Pueblo plans to have all of these cells constructed. This DEA discusses the potential environmental effects of constructing 10 additional wetland cells to complete the design capacity of 12 cells.

The first phase of the currently proposed project is to construct two additional secondary treatment wetland/evaporation cells, cells 4 and 5 (Appendix D, p. C-01). These two cells would provide the greatest capacity for processing effluent given the Pueblo's available budget. The alignment of the two cells would utilize the design and cross section found in the Project Plans (Appendix D, p. C-02). The size of cell 4 would be 120' x 400' and cell 5 would be 130' x 400'. Construction would involve shallow excavation of existing soils, which would be used to construct berms for the wetland cells. Soil testing has been conducted to verify the previous subsurface investigations. This information will be used to specify the construction compaction requirements for the berms at both lagoons. The total construction cost for the first phase is $873,000. Federal costs would be $627,750 and non-Federal costs would be $209,250. The duration of the proposed construction would be nine months and is expected to start in September 2008.

2.2 Alternatives Considered

Other methods for providing additional wastewater treatment/disposal capacity were considered in the development of the initial Project Plans (Wilson and Associates 1992; Molzen-Corbin & Associates 1997b; USEPA 1998). These included: surface water discharge; landscape, crop or rangeland irrigation; and construction of sub-surface wetlands. These methods were evaluated for their ability to treat secondary effluent while meeting budget constraints, minimizing operations and maintenance requirements, and creating wetland habitat. The current proposal using surface wetland cells would best meet these criteria. Other sites were considered initially, and the proposed site was selected for its feasibility and proximity to the existing treatment facility (Molzen Corbin Associates 1997a). Other cells within the facilities plan were considered for construction in the first phase; however, they could not provide sufficient capacity to accommodate existing wastewater flows. Alternatives considered and rejected were discussed in detail in the USEPA's 1998 Environmental Assessment.

2.3 The No-Action Alternative

Under the No-Action alternative, there would not be any construction of the secondary treatment wetland cells. No federal funding would be expended and there would be no new effects to the project site or surrounding environment. However, the No-Action alternative would not provide the Pueblo of Zuni with secondary wastewater treatment sufficient for effluent disposal. The No-Action alternative should be perceived as an environmentally unsound course of action with regard to the deficiency of the existing system, forcing incompletely treated sewage to overflow onto land adjacent to into the Zuni River.

3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

3.1 Physiography, Geology, and Soils

Soils within the project area are mapped as Aquima-Hawaikuh silt loams, 1 to 5 percent slopes (ca. 84% of area) and Nuffel-Vendadito Complex, 1 to 3 percent slopes (ca. 16% of the area) (USDA 2008). Aquima and Hawaikuh silt loams occur on alluvial fans and stream terraces and are described as well drained, not susceptible to flooding or ponding, and with a depth or greater than 80 in. to the water table. Nuffel and Venadito soils occur on flood plains and swales on valley floors. They are well drained, with depth to water table of greater than 80 inches. However, these mapped soil units may not reflect specific conditions on site. Soil testing indicates that soils onsite actually have low permeability.

A soils report prepared in 2000, by Geo-Test, Albuquerque, New Mexico indicates soils predominantly classified as CL (lean clay) and SC (clayey sand) according to the Unified Soil Classification System (USCS). “Lean clay” refers to the soil’s structural properties; this classification indicates clay that does not have overly expansive (shrink/swell) properties. Soils had Plasticity Index values (PIs) ranging from 6 to 26. The project specifications required earth embankments to be constructed of soils with PI values less than 20.

Corps Geotechnical Engineers visited the project site in April 2006 and sampled soils. All soil tested characterized as lean clay or lean clay with sand, with Plasticity Index ranging from 10 to 24. The results were very similar to the results obtained by Geo-Test and both soil reports indicate that tested site soils are suitable for use as embankment fill.

The soils in the proposed wetlands area are classified in the loamy and clayey ecological sites (Aquima-Hawaikuh) and clayey bottomland and bottomland ecological sites (Nuffel-Vendadito Complex). The vegetation of these ecological sites is short and medium grasses, forbs, and shrubs. These soils are used for range, wildlife, dryland farming, and irrigated farming. There would be no effect to soils by the no-action alternative. The proposed project would have a minor, long-term effect to soils by changing the site’s topography and converting areas of upland soil to wetland and open water.

3.2 Climate

McKinley County has a semiarid climate. However, the climate is highly varied because of the wide range in elevation and the uneven topography. Elevation ranges from 5,800 feet near the Chaco river to over 8,000 feet in the Zuni Mountains. The elevation at the project site is 6220-6240 feet. The average winter temperature at Zuni is 33.7 degrees F, with an average daily minimum of 18.2 degrees. Summer temperature averages 68.6 degrees F, with average daily maximum of 86.6 degrees. Average annual precipitation ranges from about 8 to 18 inches within the county and is 12.88 inches in Zuni. About 40% of the total precipitation falls during the frost-free season of May to September, with most falling as brief, generally heavy thunderstorms in the period of July through September (USDA 2005, 2008).

3.3 Water Quality

Section 402 of the Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.*), as amended, regulates point-source discharges of pollutants into waters of the United States and specifies that storm-water discharges associated with construction activities shall be conducted under the National Pollution Discharge Elimination System (NPDES) guidance. Construction activities characterized by clearing, grading, and excavation are associated with storm-water discharges, subjecting the underlying soils to erosion by storm-water. The NPDES general permit guidance would apply to this project because the total project area is greater than one acre. Therefore, a Storm-Water Pollution Prevention Plan (SWPPP) is required and would be prepared by the contractor for this project. Standard Best Management Practices to prevent on- and off-site erosion, sediment and stormwater discharges would be incorporated in contract specifications and the SWPPP, and would include silt fences, straw bales, geotextiles, or similar measures. Impacts from storm-water are expected to be negligible.

Section 404 of the CWA, (CWA; 33 U.S.C. 1251 *et seq.*) as amended, provides for the protection of waters of the United States through regulation of the discharge of dredged or fill material. The Corps' Regulatory Program (33 CFR Parts 320-330) requires that a Section 404 evaluation be conducted for all proposed construction that may affect waters of the United States. Section 404 of the CWA does not apply to this project, as there would be no discharge of dredged or fill material into waters of the United States.

Section 401 of the CWA, (CEA; 33 U.S.C. 1251 *et seq.*) as amended, requires that a Water Quality Certification Permit be obtained for anticipated discharges associated with construction activities or other disturbance within waterways. Section 401 of the CWA does not apply to this project, as there would be no discharge associated with construction activities or other disturbance within waterways.

Under the No-action alternative, water quality in the Zuni River would worsen as incompletely treated sewage effluent would be released to land adjacent to the river during periods of high flows. The proposed project would protect and improve water quality in the Zuni River by ensuring that wastewater effluent does not reach the river.

3.4 Floodplains and Wetlands

Executive Orders 11988 (Floodplain Management) provides Federal guidance for activities within the floodplains of inland and coastal waters. The order requires Federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. The proposed project area is not located within any special flood hazard areas inundated by the 100-year flood. It is located in Zone X of the floodplain map, which is designated as areas that are outside the 500-year flood (Federal Emergency Management Agency 2008).

Executive Order 11990 (Protection of Wetlands) requires the avoidance, to the greatest

extent possible, of both long and short-term impacts associated with the destruction, modification, or other disturbance of wetland habitats. There are no naturally occurring wetlands within the project area, and therefore, no impacts to wetlands would occur. The constructed wetlands would result in a net gain of wetlands in the project area.

3.5 Air Quality, Noise, and Aesthetics

The New Mexico Environment Department (NMED)'s continuous air quality monitoring sites closest to Zuni are located in San Juan County. The Pueblo of Zuni has recently implemented an air quality monitoring program, but this data is not available through NMED. Air quality in the project area is generally known to be good. However, in August of 2005, the Ciniza gasoline-fractioning plant outside of Gallup was found to have violated Clean Air Act statutes. Zuni Pueblo Lt. Governor, Carmelita Sanchez, was concerned about the smoke in the air. Sanchez, along with the former Zuni EPA director, agreed than the tribe needed to gain more information about their air quality. Under a consent order between Ciniza and NMED, funding was provided to implement an air monitoring project in Zuni. Data from this program have not yet been analyzed; however, preliminary data suggests that particulates are the major potential air quality concern in the area (personal communication, S. Beran, Zuni Division of Natural Resources).

The closest Class I air quality areas are the Gila and Leopold Wilderness Areas within the Gila National Forest, which is approximately 200 kilometers (125 miles) to the south of the project area. Class I areas are special areas of natural wonder and scenic beauty, such as national parks, national monuments, and wilderness areas, where air quality should be given special protection. Class I areas are subject to maximum limits on air quality degradation.

The proposed project would result in a temporary but negligible increase in suspended dust particles from construction activities. Best Management Practices to be followed during construction to minimize dust include wetting of access roads and berms. A Fugitive Dust Control Permit is needed when there will be surface disturbance to three-quarters of an acre or more. Because the proposed project would disturb more than three-quarters of an acre, the contractor would obtain an approved permit from the New Mexico Environmental Department. All vehicles involved in transporting rubble and spoil from the project site to the deposition area would be covered and would be required to have passed a current New Mexico emissions test and have required emission control equipment. These practices would minimize dust and emissions-related air quality impacts during construction. Once construction is complete, the wetland treatment cells would have no further effects on air quality. Therefore, air quality in Zuni Pueblo, McKinley County and the Gila National Forest would not be affected by the proposed project or by the no-action alternative.

Background noise levels in the proposed project area are relatively low. During construction, noise would temporarily increase in the vicinity during vehicle and equipment operation. The Noise Center (League for the Hard of Hearing, 2008) advises that noise levels above 85 decibels will harm hearing over time and noise levels above 140 decibels can cause damage to hearing after just one exposure. However, the increase in noise during construction

would be minor and temporary, ending when construction is complete. Therefore, the proposed project would have no significant affect on noise.

Aesthetically, the terrain of the project area is characterized by two existing secondary treatment wetland cells and open space. The area receives minimal recreational use with the intent of viewing scenery. Aesthetic conditions would not be affected by the no-action alternative. The proposed project would have a temporary effect on aesthetics. During construction, heavy equipment would be visible in the work area and from Ojo Caliente Road. After project completion, opportunities for wildlife viewing would increase, adding recreational or educational opportunity in the area.

3.6 Vegetation Communities

The project area is part of the Great Basin Conifer Woodland biotic community (Brown and Lowe 1977; Brown 1982). Site visits by Corps personnel on August 5, 2005 and April 22, 2008, revealed a 200-acre, relatively open lot, containing upland vegetation and two existing wetland cells with well-established wetland plants on their perimeters. Within the open area, vegetation consists of alkalai sacaton (*Sporobolus airoides*), snakeweed (*Gutierrezia sarothrae*), scattered one-seed juniper (*Juniperus monosperma*), gray rabbitbrush (*Ericameria nauseosa*), big sagebrush (*Artemisia tridentata*), fourwing saltbush (*Atriplex canescens*), sand sagebrush (*Artemisia filifolia),* Russian thistle (*Salsola tragus)* and kochia (*Kochia scoparia*). Grama grasses (*Bouteloua* spp.) and Indian ricegrass (*Achnatherum hymenoides*) are common in the area (Quam 2000). The no-action alternative would result in no effects to this vegetation.

Under the propsed project, much of this upland vegetation would be converted to wetland vegetation. Species that occur in the existing wetland cells would be transplanted into the cells proposed for construction. These include cattails (*Typha latifolia*), smartweed (*Polygonum* spp.), softstem, hardstem and three square bulrush (*Scirpus validus, S. acutus, S. americanus*), curly dock (*Rumex crispus*), Torrey's rush, knotted rush (*Juncus torreyi, J.nodosus*), yellow monkey flower (*Mimulus* sp.), and arrowhead or duck potato (*Sagittaria* sp.). The upland vegetation community is common and does not support rare species, while wetlands are less common and provide important wildlife habitat and foraging areas. Therefore, the conversion of upland to wetland vegetation under the proposed project would be beneficial.

3.7 Wildlife

A variety of species are known to occur within the project area and are included in the Great Basin Conifer Woodland biotic community. Some of these species may include: Stephen's woodrat (*Neotoma stephensi*), deer mouse (*Peromyscus maniculatus*), desert cottontail (*Sylvilagus audubonii*), mule deer (*Odocoileus hemionus*), Gunnison's prairie dog (*Cynomys gunnisoni*), yellow shafted flicker (*Colaptes auratus*), redtail hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). Domestic animals that graze within the 200-acre area include sheep (*Ovis aries)* and cattle (*Bos taurus*) (Quam 2000).

On the April, 2008 site visit, a variety of waterfowl and wetlands-associated species were observed using the existing wetland cells, including mallard (*Anas platyrhynchos*), shoveler (*Anas clypeata*), cinnamon teal (*Anas cyanoptera septentrionalium*), ruddy ducks (*Oxyura jamaicensis rubida*), American coot (*Fulica americana*), and a great blue heron (*Ardea herodias)* eating a salamander. Pueblo of Zuni personnel reported observing red-winged and yellow-headed blackbirds (*Agelaius phoeniceus, Xanthocephalus xanthocephalus*), Canada geese (*Branta canadensis),* and migrating songbirds and white-faced ibis (*Plegadis chihi*) using the wetlands. Bald eagle (*Haliaeetus leucocephalus*) has been observed in the area by Pueblo of Zuni personnel and may forage at the wetlands.

The proposed project construction would take place entirely within the 200-acre fenced area. Some wildlife would be temporarily displaced during construction but is expected to return after construction is complete. No direct negative impacts should occur to wildlife as a result of the proposed project or the no-action alternative. The created wetland cells are expected to benefit species of wildlife that use riparian and wetland habitat.

3.8 Special Status Species

Three agencies have primary responsibility for protecting and conserving plant and animal species within the proposed project area. The United States Fish and Wildlife Service (USFWS), under authority of the Endangered Species Act of 1973, has the responsibility for Federal listed species. The New Mexico Department of Game and Fish (NMDGF) has the responsibility for state-listed wildlife species. The New Mexico State Forestry Division (Energy, Minerals, and Natural Resources Department) has the responsibility for state-listed plant species. Special status species that occur in McKinley County and may occur near the proposed project area are listed below in Table 1 (USFWS 2008, NMDGF 2008).

Table 1. Special Status Species Listed for McKinley County, New Mexico, that have the Potential to Occur in the Vicinity of the Proposed Project.

Common Name	Scientific Name	Federal Status (USFWS)[a]	State of New Mexico status (NMDGF)[b]
Animals			
Bald Eagle	*Haliaeetus leucocephalus*	DM	T
Black-footed Ferret	*Mustela nigripes*	E, EXPN	---
American Peregrine Falcon	*Falco peregrinus anatum*	---	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	E
Least Tern	*Sterna antillarum athalassos*	E	E
Mexican Spotted Owl	*Strix occidentalis lucida*	T	S
Zuni Bluehead Sucker	*Catostomus discobolus yarrowi*	C	E
Artic Peregrine Falcon	*Falco peregrinus tundrius*	---	T
Costa's Hummingbird	*Calypte costae*	---	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C	S
Gray Vireo	*Vireo vicinior*	---	T

[a] **Endangered Species Act (ESA)** (as prepared by U.S. Fish and Wildlife Services) **status:** Only Endangered and Threatened species are protected by the ESA.
E= Endangered: any species that is in danger of extinction throughout all or a significant portion of its range.
T= Threatened: any species that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.
C= Candidate: taxa for which the Services has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
DM= Delisted Taxon, Recovered, Being Monitored First Five Years
EXPN = Experimental Population, Non-Essential
P= Proposed for listing in the identified category listed above.
S/A= Similarity of Appearance.

[b] **State of New Mexico status:**
E= Endangered: Animal species whose prospects of survival or recruitment within the state are in jeopardy.
T= Threatened: Animal species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.
S= Sensitive Taxa (informal).

The Bald Eagle, a Federally delisted and State Threatened species, is normally found near major waterways and larger lakes where adequate food supplies may be found. The Bald Eagle is known to occur in New Mexico primarily during the late fall and winter months. Bald Eagles

utilizes large trees for perching and forage primarily for fish, ducks, and carrion along rivers and at local reservoirs. No preferred habitat exists within or near the project area. Due to the lack of large trees for roosting and the limited disturbance of the proposed project, there would be no effect to the Bald Eagle.

The Gray Vireo (*Vireo vicinior)*, a State-threatened species, is known to occur on Pueblo of Zuni lands and prefers open juniper woodland habitat. The project area contains very few junipers and is therefore unlikely to support breeding or summer resident vireos. Because of lack of preferred habitat and timing of construction, there would be no affect to the Gray Vireo.

The Zuni Bluehead Sucker, a Federal Candidate and State Endangered species, is endemic in the Zuni River drainage (NMDGF, 2006). Currently, the quality and quantity of habitat in the watershed appropriate for Zuni bluehead sucker vary (Carmen, 2004). Continuous flow is not present from the headwaters downstream to the Arizona/New Mexico border; surface flow is generally only continuous during heavy spring runoff. Many stream reaches are dry except near perennial springs. The Zuni River is located north of the proposed project and would not be affected by the proposed project. Also, known populations of the Zuni Bluehead Sucker are located several miles upstream of the proposed project area. Because the Zuni River would not be affected by the proposed project, there would be no effect to the Zuni Bluehead Sucker.

Other special status animals listed in Table 1 have not been detected in the project area and would not affected by the proposed project due to the limited disturbance and the lack of preferred habitat in the project area.

The New Mexico Department of Minerals, Natural Resources, Forestry Division has the responsibility for maintaining the list of state-listed endangered plant species. The New Mexico Rare Plants Technical Council list indicates that there are fifteen rare plant species that occur in McKinley County (New Mexico Rare Plants Technical Council 2008; see Table 2) One of these plants, Zuni fleabane, is Federally listed as endangered. Although these plants are known to exist in McKinley County, they are not likely to occur within the project area. Most occur at higher elevations or on specialized substrates that do not occur in the project area. Also, there was no presence of these species during the site visit to the project area. Therefore, there would be no effect to these rare plants by the proposed project or the no-action alternative.

Table 2. Rare, Threatened and Endangered Plants Listed for McKinley County, New Mexico

Chuska milkvetch	(*Astragalus chuskanus*)
Clifford's milkvetch	(*A. cliffordii)*
Heil's milkvetch	*(A. heilii)*
Chaco milkvetch	(*A. micromerius*)
Zuni milkvetch	(*Astragalus missouriensis* var. *accumbens*)
Naturita milkvetch	(*Astragalus naturitensis*)
Acoma fleabane	(*Erigeron acomanus*)
Zuni fleabane	(*Erigeron rhizomatus*)
Sivinski's fleabane	(*Erigeron sivinskii*)
Clipped wild buckwheat	(*Eriogonum lachnogynum* var. *colobum)*
Sarah's wild buckwheat	(*Eriogonum lachnogynum* var. *sarahiae)*
Navajo muhly	(*Muhlenbergia arsenei)*
Navajo bladderpod	(*Lesquerella navajoensis*)
Parish's alkali grass	(*Puccinellia parishii*)
Clifford's groundsel	(*Senecio cliffordii)*

3.9 Cultural Resources

The National Historic Preservation Act of 1966, as amended, requires Federal agencies, Tribes, and project sponsors seeking Federal funding and/or permits to conduct cultural resources surveys to locate, identify, and evaluate historic and prehistoric resources, traditional cultural properties, and other areas of Tribal concern in advance of construction implementation. In 1999 and 2000, when the USEPA was the lead Federal Agency for this project, the proposed location was surveyed for archaeological resources, and traditional cultural property (TCP) interviews were conducted by the Zuni Cultural Resources Enterprise (ZCRE). Archaeological and traditional cultural properties reports were prepared by ZCRE and reviewed by the New Mexico State Historic Preservation Officer (SHPO). The recommendations in the report were concurred with by SHPO. Of the 10 archaeological sites that were recorded, nine are eligible to the National Register of Historic Places under criterion "d". The strategy proposed by ZCRE was to avoid impacts to the sites through a combination of restricting construction and or salt cedar removal in certain locations, fencing, and monitoring during construction.

The earliest archaeological record of the project area is similar to that of the greater Southwest; it is not until relatively recent times that material identified as ancestral Zuni occurs. The earliest inhabitants of this area, nominally beginning around 10,000 B.C., were the mobile hunter-gatherers of the late Pleistocene Period who pursued such large, now extinct, mega-fauna as mammoth, mastodon, bison, cave bear, and the ground sloth. The Paleo-Indians were followed in turn by the hunter-gatherers of the Archaic Period who lived in an essentially modern environment. They pursued plants and animals that remain today. By about 5000 B.C. the transition to a modern environment was complete today. Towards the end of the Archaic populations were increasing, territories were being reduced in size, and the transition to reliance on agriculture was under way. Sites from either of these two periods are rare in the Zuni area;

most finds are diagnostic isolated spear points sometimes found in secondary contexts (Quam 2000:11).

The subsequent Pueblo Period is subdivided into seven or eight temporal periods, each defined by combinations of differing location, arrangements of above and below ground architecture, stone and or adobe construction, pottery form and decoration, etc. During the earliest portion of this period, the Basketmaker (A.D. 1-700) villages of generally small numbers of people living in fully- to semi-subterranean single room structures with earthen floors and above ground storage features were dispersed across the Zuni region. Several such sites have been excavated and others recorded during survey. During the Pueblo I Period (A.D. 700-950) the habitations generally consisted of deep pitstructures with plastered earthen walls and prepared masonry floors. Numerous Pueblo I sites occur in the Zuni area (Quam 2000:11).

Based on the number of recorded sites there was a marked increase in the Zuni area population during the Pueblo II Period (A.D. 950-1150). The structures consist of room blocks with full-height masonry walls built in conjunction with circular underground ceremonial structures known as kivas. At least one large ceremonial center that was an outlier location of the developments in Chaco Canyon some 75 miles north of Zuni dates to this period. It was partially excavated in the 1930s and in addition to integrating the Zuni area population into the Chacoan system, it also served as a locus for the local community interaction (Quam 2000:11).

The population of the Zuni area also increased during the following Pueblo III Period (A.D. 1150-1300). Site layout and construction were similar to the preceding period; however, the average sites were larger, and plazas were incorporated into and adjacent to the room blocks. The Pueblo IV Period (A.D. 1300-1540) is not well understood here. The bulk of the Zuni population moved westward to the Zuni River and were living in six large towns, including the current Pueblo, when Coronado arrived in 1540 (Quam 2000:12).

The Historic Period is initiated by the arrival of the Spanish in 1540. After the Pueblo Revolt in 1680, the Zuni moved to the top of the nearby Dowa Yalanne Mesa. Following the Spanish return to New Mexico in 1692, the Zuni returned to Zuni Pueblo and have remained there ever since. They also established outlying seasonally-occupied residences located for defense, farming, and herding. With the inception of the American acquisition of New Mexico in 1948, the Zuni came into increasingly frequent contact with Hispanics, Anglos, technological innovations, and the cash economy. After 1945, over-grazing, environmental degradation, clear-cutting, erosion, and the cash economy caused a decrease in the importance of farming (Quam 2000:12).

The project area is Pueblo of Zuni Trust Land and is within the traditional hunting and agricultural lands of the Zuni. The area was surveyed for archaeological resources in November and December, 1999, by archaeologists from the Zuni Cultural Resources Enterprise who conducted a 100 percent intensive inventory of the location. A total of seven new sites were discovered and two previously recorded sites were rerecorded (Quam 2000:12). Due to a slight change in the project's location an additional survey was conducted on four days in April 2000. One additional site and six isolated occurrences were recorded (Nieto 2001). The sites include a multicomponent Pueblo II ceramic and stone scatter and Historic Zuni ceramic scatter, historic

wells and associated features, ceramic and stone scatters from the Basketmaker III, Pueblo I, II, III, and IV Periods, and an old sheep corral (Quam 2000:15-31).

Of the 10 archaeological sites recorded by the two surveys, nine were recommended eligible for the National Register of Historic Places. This recommendation was concurred with by the Zuni Tribal Historic Preservation Officer (THPO) and the New Mexico SHPO. The THPO proposed that the project be designed to avoid impacts to the sites and portion of the construction work be monitored by qualified archaeologists so that there will be no inadvertent impacts to the sites. The SHPO concurred with this proposal (letter from Pueblo of Zuni dated 26 April 2000 and concurred with by SHPO on 8 May 2000; NMCRIS No. 059698).

In addition to the archaeological surveys, the Zuni Historic Preservation Office conducted a Traditional Cultural Properties (TCP) assessment for the project location. The project was described to the Zuni Cultural Resources Advisory Team and the team then visited the location for two days in October 1999. In addition to considering the archaeological sits as TCPs several other locations and items of concern in and near to the work area were indicated. The avoidance and monitoring strategy noted above were devised in consultation among the members of the Cultural Resources Advisory Team and the Zuni Historic Preservation Office (Panteah and Damp 2000).

The proposed project would have no adverse effect on the archaeological sites or traditional cultural properties in the area. The archaeological sites would be fenced in cooperation with the Zuni THPO and their locations indicated on the construction plans. The staging areas, access routes, and construction zone would be marked and situated such that the heavy equipment would not cause inadvertent damage. The work would be monitored by archaeologists from Zuni. In the event that buried materials are exposed, work would stop in the vicinity of the discovery and appropriate representatives from the Zuni THPO and Cultural Resources Advisory Team would be contacted. No work would resume in the location of the discovery until the situation has been resolved to the satisfaction of all concerned.

3.10 Land Use and Socioeconomic Considerations

Zuni Pueblo encompasses about 450,000 acres in southwestern McKinley County, New Mexico (Pueblo of Zuni 2008). The population of Zuni Pueblo in 2000 was 6,367 (U.S. Census Bureau, 2000). Within Zuni Pueblo, the ethnic background is: Native American, 97.0%; Anglo, 2.1%; African-American, less than 0.1%; Asian, less than 0.1%; Other race or two or more races, 0.8%. In 2000, the estimated median household income in Zuni Pueblo was $22,559 with 43% of individuals living in poverty. Major employment sectors are: educational, health and social services; manufacturing; retail; public administration; and construction (U.S. Census Bureau, 2000). The annual average unemployment rate for McKinley County in 2007 was 4.5% compared to the statewide rate of 3.6% (New Mexico Department of Workforce Solutions 2008). The Pueblo of Zuni operates several tribal enterprises including the A:shiwi A:wan Museum & Heritage Center, Pueblo of Zuni Arts & Crafts, Zuni Forest Products & Services Enterprise, and Zuni Cultural Enterprise (Pueblo of Zuni, 2008).

The proposed project would take place entirely within the 200-acre fenced property. Besides the two existing lagoons, the majority of the property is an open field. Adjacent land uses and features include roads, rangeland, and the Zuni River. The proposed project would not affect land use or socioeconomic resources in the project area. The entire Pueblo of Zuni would benefit from the proposed construction of the secondary treatment lagoons.

3.11 Indian Trust Assets

Indian Trust Assets are legal interests in property held in trust by the United States for Indian tribes or individuals. Examples of trust assets include land, minerals, hunting and fishing rights, and water rights. The United States has an Indian Trust Responsibility to protect and maintain rights reserved by or granted to Indian tribes or individuals by treaties, statues, executive orders, and rights further interpreted by the courts. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect such trust assets. There would be no effect on Indian Trust Assets by the proposed project, as this project takes place on Pueblo of Zuni land by the Pueblo's request and is being coordinated with Pueblo input and approval.

3.12 Human Health and Safety

Currently, the Pueblo of Zuni's wastewater treatment system lacks sufficient capacity to accommodate existing wastewater flows. The deficiency of the existing system forces incompletely treated sewage effluent to overflow onto land adjoining the Zuni River, which is a health threat to the residents of Zuni Pueblo and downstream water users. Increased wastewater flow from continued population growth will worsen the current situation and pose a greater health risk to the public.

Therefore, the proposed construction of the ten additional secondary treatment lagoons is needed to provide the Zuni Pueblo with sufficient capacity for effluent disposal and to address existing deficiencies. This would alleviate the problem of having effluent overflow into the Zuni River. Human health and safety would be beneficially affected due to the proposed project.

During the construction of the proposed treatment lagoons there is a potential of worker exposure to untreated sewage. To mitigate this risk, a certified industrial hygienist will be on-site during construction and will specifically address this issue in the Health and Safety Plan. No other hazardous or toxic wastes or substances have been identified as concerns.

3.13 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Low-Income Populations; February 11, 1994) was designed to focus the attention of federal agencies on the human health and environmental conditions of minority and low-income communities. It requires federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations and proposed actions. The 1995 EPAguidance

document, “Environmental Justice Strategy: Executive Order 12898” defines the approaches by which the EPA will ensure that disproportionately high environmental and/or socioeconomic effects on minority and low-income communities are identified and addressed. Further, it establishes agency wide goals for all Native Americans with regard to Environmental Justice issues and concerns.

The Pueblo of Zuni Wastewater Collection System Improvement Project would be conducted under Section 595 of the Water Resources Development Act of 1999 (Public Law 106-53; 33 U.S.C. 2201 *et seq*.) as amended. This program is largely intended to provide needed assistance (technical, financial, etc.) to communities in which water resources are degrading and in need of improvement. As such, this project would benefit an area within a minority and low-income community. All areas of the Pueblo of Zuni would be serviced by the proposed improvements. These improvements could decrease health risks to nearby rural residents from the inadequate treatment that currently exists. No adverse impacts on minority and low-income populations are expected. Under the definition of Executive Order 12898, there would be no adverse environmental justice impacts under the proposed action.

3.14 Noxious Weeds and Invasive Species

The Federal Noxious Weed Act of 1974 (Public law 93-269; 7 U.S.C. 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Executive Order 13112 directs Federal agencies to prevent the introduction of invasive (exotic) species and to control and minimize the economic, ecological, and human health impacts that invasive species cause. In order to prevent new infestations of noxious weeds and invasive species, all equipment would be cleaned with a high-pressure water jet before entering the area. Following construction, native wetland species would be planted in the wetland cells, minimizing the opportunity for invasive species to colonize the area. Therefore, the proposed project is in compliance with the Federal Noxious Weed Act and Executive Order 13112.

3.15 Cumulative Impacts

NEPA defines cumulative effects as “…the impact on the environment which results from the incremental impact of the action when added to other, past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”

The footprint of the proposed project lies within a rural area. The proposed location for the secondary treatment wetland cells is located within a 200-acre fenced area where two existing lagoons are located. The construction of ten secondary treatment cells would not significantly impact the current conditions of the local environment. Positive wastewater treatment improvements are anticipated to occur from the proposed project that would enhance the quality of life for residents in the area. For these reasons, the proposed project when combined with past, present, or future activities in the Zuni Pueblo would not significantly add to or raise local cumulative environmental impacts to a level of significance.

4.0 CONCLUSIONS AND SUMMARY

This Draft Environmental Assessment addresses the method and potential effects for the construction of ten secondary and tertiary treatment wetland cells. The proposed location for the wetland/evaporation cells is within a 200-acre fenced area where two cells have previously been constructed. Impacts to the environment would be non-significant and short-term. A long-term benefit to wildlife would result from the creation of wetlands. The proposed secondary treatment wetlands would benefit the entire Pueblo of Zuni. The proposed project would not result in any moderate or significant, short-term, long-term, or cumulative adverse effects. Therefore, construction of the proposed project would not significantly affect the quality of the human environment and is recommended for implementation.

5.0 PREPARATION, CONSULTATION AND COORDINATION

5.1 Preparation

This DEA was prepared for the Pueblo of Zuni by the U.S. Army Corps of Engineers, Albuquerque District (USACE). Personnel primarily responsible for preparation include:

Danielle A. Galloway	Biologist
Dana M. Price	Botanist
Suzi R. Hess	Geologist
Shelley D. Ramos	Geologist
Lara E. Beasley	Environmental Engineering Section
George E. Diewald	Structural
Richard O. Zaragoza	Structural
Al Lopez	Real Estate
Mark L. Paulus	Civil Engineer
Kerry L. Horner	Civil Engineer
John D. Schelberg	Archaeologist
Alan R. CDeBaca	Cost Estimator
Terresa L. Reed	Civil Engineer
Paul H. Gendron	Mechanical Engineer
Pete K. Doles	Project Manager
Michael P. Martinez	Project Manager

5.2 Quality Control

This Draft Environmental Assessment (DEA) has been reviewed for quality control purposes. Personnel who reviewed this DEA include:

Champe B. Green	Ecologist
Gregory Everhart	Archaeologist
Ondrea Hummel	Chief, Environmental Resources Section
Louis Gross	Construction Project Manager, Pueblo of Zuni
Nelson Luna	Director, Pueblo of Zuni Fish and Wildlife Department

5.3 General Consultation and Coordination

Agencies and entities to which this Environmental Assessment was distributed include:

Mr. Wally Murphy
US Fish and Wildlife Service
New Mexico Ecological Services Field Office

Mr. Rob Lawrence
US Environmental Protection Agency, Region 6
Office of Planning and Coordination

Mr. John Poland
US Bureau of Reclamation

Mr. Don Borda
Chief, Regulatory Branch
US Army Corps of Engineers

Mr. Leigh Hubbard
Indian Health Service

Mr. Robert Sivinski
NM Forestry and Resources Conservation Division
Energy, Minerals, and Natural Resources Department

Mr. Matt Wunder
NM Department of Game and Fish
Conservations and Services Division

Mr. Ed Kelley
Water and Waste Management Division
NM Environmental Department

Mr. John R. D'Antonio, Jr.
NM State Engineer

Mr. Estevan Lopez
NM Interstate Stream Commission

Honorable Norman Cooeyate
Governor, Pueblo of Zuni

Mr. Andrew Othole
Pueblo of Zuni Office of Planning and Development

Mr. Roman Pawluk
Director, Pueblo of Zuni Conservation Department

Mr. Nelson Luna
Director, Zuni Fish and Wildlife Department

Mr. Jonathan Damp
Zuni Cultural Preservation Office

6.0 REFERENCES CITED

Brown, David E. 1982. **Desert Plants: Biotic Communities of the American Southwest-United States and Mexico**. University of Arizona, Superior, Arizona.

Brown, David E. and C.H. Lowe. 1977.**Biotic Communities of the Southwest Map**. USDA Forest Service, Ft. Collins, Colorado.

Carmen, Stephanie M. 2004. **Zuni Bluehead Sucker (*Catostomus discobolus yarrowi*) Recovery Plan.** New Mexico Game and Fish: Conservation Services Division.

League for the Hard of Hearing. 2008. **Noise Center**. http://www.lhh.org/noise/facts/evironment.html

Molzen-Corbin Associates. 1997a. Pueblo of Zuni Wastewater Treatment and Disposal Facilities Plan. Final Report. On file, Pueblo of Zuni and USACE, Albuquerque District.

Molzen-Corbin Associates. 1997b. Pueblo of Zuni. Addendum No. 1 to Wastewater Treatment and Disposal Facilities Plan "Final Report". On file, Pueblo of Zuni and USACE, Albuquerque District.

Federal Emergency Management Agency. 2008. 1987. National Flood Insurance Program. **Flood Insurance Rate Map for Zuni Pueblo, McKinley County, New Mexico**. Community-Panel Number 350143 0125B.

New Mexico Department of the Game and Fish (NMDGF). 2008. **New Mexico Species List/Species Account – BISON-M.** http://www.bisonm.org (Accessed: 10 March 2008).

New Mexico Department of Workforce Solutions 2008. Economic Research and Analysis. Table A- Civilian Labor Force, Employment, Unemployment and Unemployment rate 2007. Updated: 1/16/1008. http://www.dws.state.nm.us/LMI/dws-data.html#TA (accessed: 8 April 2008)

New Mexico Environmental Department, Air Quality Bureau (NMED/AQB). 2006. **New Mexico Air Quality**. New Mexico Environmental Department. http://air.state.nm.us/ (Accessed: 10 March 2008).

New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page. http://nmrareplants.unm.edu (Latest update: 6 December 2007). (Accessed: 10 March 2008)

Nieto, Jr., Davis. 2001. **An Addendum to a Cultural Resources Survey of the Zuni Wetlands Project, Zuni Indian Reservation, McKinley County, New Mexico.** Zuni Cultural Resources Enterprise Report No. 652a. On file, Pueblo of Zuni.

Panteah, Loren and Jonathan E. Damp. 2000. **Zuni Traditional Cultural Properties Assessment for Zuni Waste Water Lagoon and Wetland Disposal Project, Zuni Indian Reservation, McKinley County, New Mexico.** ZHHPO Report No. 234. On file, Pueblo of Zuni.

Pueblo of Zuni, 2008. Official site of the Zuni tribe. http://www.ashiwi.org/ (Accessed: 8 April 2008)

Quam, Donovan K. 2000. **A Cultural Resources Survey of the Zuni Wetlands Project, Zuni Indian Reservation, McKinley County, New Mexico.** Zuni Cultural Resources Enterprise Report No. 652. On file, Pueblo of Zuni.

U.S. Census Bureau. 2000. Profiles of General Demographic Characteristics. 2000 Census of Population and Housing: **New Mexico.** http://censtats.census.gov/data/NM/1603586595.pdf (Accessed: 8 April 2008)

U.S. Census Bureau, 2005. Small Area Income and Poverty Estimates for New Mexico Counties, 2005. http://www.census.gov/hhes/www/saipe/county.html (Accessed: 8 April 2008)

U.S. Department of Agriculture. 2005. Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties.

U.S. Department of Agriculture. 2008. Online **Soil Survey for McKinley County**. http://websoilsurvey.nrcs.usda.gov/app/ (Accessed: 10 March 2008).

U.S. Environmental Protection Agency. 1998. Environmental Assessment. Rehabilitation of existing sewage lagoons and construction of a land application site to increase wastewater capacity for the Zuni Pueblo, Zuni, New Mexico. On file, Pueblo of Zuni.

U.S. Fish and Wildlife Service. 2007. Species assessment and listing priority assignment form: Catostomus discobolus yarrowi (Zubi Bluehead sucker). http://ecos.fws.gov/docs/candforms_pdf/r2/E063_V01.pdf

U.S. Fish and Wildlife Service. 2008. **Endangered Species List: McKinley County, New Mexico.** http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ (Accessed: 10 March 2008).

Wilson, L. and Associates. 1992. Pueblo of Zuni, New Mexico Environmental Information Document for Wastewater Collection System Improvements. On file, Pueblo of Zuni and USACE, Albuquerque District.

Appendix A
Cultural Resources Coordination

PUEBLO OF ZUNI
P.O. Box 339
1203-B State Highway 53
Zuni, New Mexico 87327-0339
505-782-4481

26 April 2000

059698

RECEIVED
APR 28 2000
JvB
HISTORIC PRESERVATION DIVISION

CULTURAL RESOURCE ENTERPRISE
MAY 10 2000

Ms. Jan Biella
State Historic Preservation Division, Office of Cultural Affairs
Villa Riveria, Room 101
228 E. Palace Avenue
Santa Fe, New Mexico 87503

Ms. Biella:

The Pueblo of Zuni and the Zuni Heritage and Historic Preservation Office present to you for your review and comment a copy of a technical report prepared by Zuni Cultural Resource Enterprise. The lead agency for this project is the Environmental Protection Agency. The Bureau of Reclamation is also involved in the undertaking but is not so named in the report, as this information was only recently made available. The report is entitled:

> *A Cultural Resource Survey of the Zuni Wetlands Project, Zuni Indian Reservation, McKinley County, New Mexico* by Donovan K. Quam

with an appendix entitled:

> *Zuni Traditional Cultural Properties Assessment for Zuni Waste Water Lagoons and Wetland Disposal Project, Zuni Indian Reservation, McKinley County, New Mexico* by Loren Panteah and Jonathan E. Damp

We concur with the findings and recommendations of the report and recommend that the archaeological sites and the traditional cultural properties be avoided. Avoidance of the archaeological sites can be accomplished by establishing protective fencing at a 10-meter buffer outside each site. Avoidance of the traditional cultural properties can be accomplished by in-field consultation between construction personnel and the Zuni Cultural Resource Advisory Team. Because of the esoteric, privileged, and sensitive nature of the traditional cultural properties not all information is divulged within the report.

If you have any questions regarding this report please call Jonathan Damp at (505) 782-4814.

Sincerely,

Malcolm B. Bowekaty
Governor, Pueblo of Zuni

Jonathan E. Damp
Director, Zuni Heritage and Historic Preservation Office

cc: project files 047-96

Concur with recommendation of eligibility and/or effects as proposed.

5/8/00

for State Historic Preservation Officer

Eligibility for archaeological sites under criterion c
eligibility for TCPs under d

Appendix B

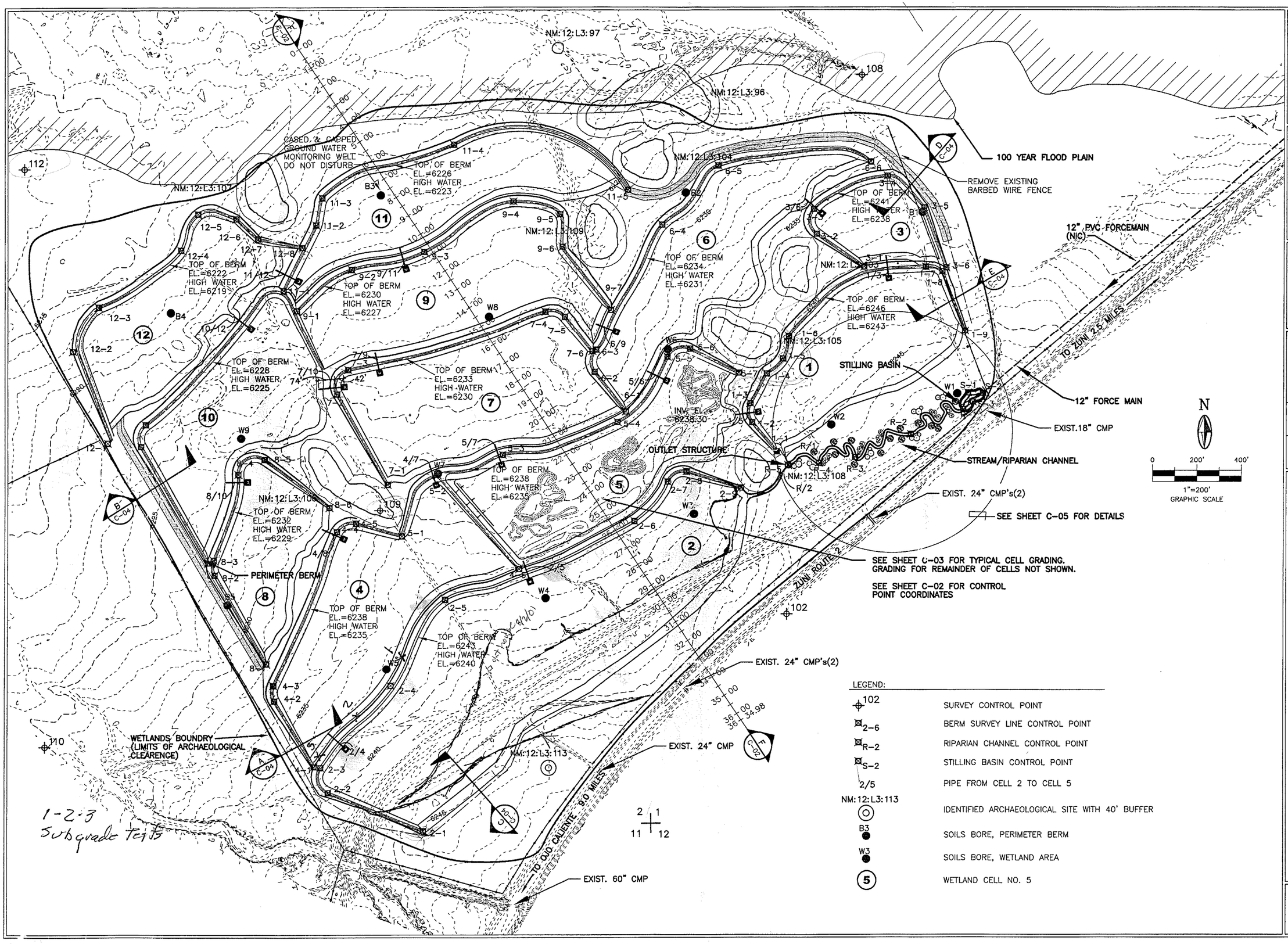
Biological Resources Coordination

Appendix C

Public Review Comments

Appendix D

Zuni Pueblo Wetland Project Plans



LEGEND:

102	SURVEY CONTROL POINT
2-6	BERM SURVEY LINE CONTROL POINT
R-2	RIPARIAN CHANNEL CONTROL POINT
S-2	STILLING BASIN CONTROL POINT
2/5	PIPE FROM CELL 2 TO CELL 5
NM:12:L3:113	IDENTIFIED ARCHAEOLOGICAL SITE WITH 40' BUFFER
B3	SOILS BORE, PERIMETER BERM
W3	SOILS BORE, WETLAND AREA
5	WETLAND CELL NO. 5

Molzen-Corbin & Associates
2701 Miles Road S.E.
Albuquerque, New Mexico 87106
voice (505) 242-0700
fax (505) 242-0973

KENNETH R. MULLER — NEW MEXICO (12548) — REGISTERED PROFESSIONAL ENGINEER — 5-24-01

REV NO	REV DATE	DESCRIPTION

PROJECT NUMBER:	ZUN 91-11.P40
DESIGNED BY:	K. MULLER
DRAWN BY:	M/C STAFF
CHECKED BY:	K.MULLER
PROJ ARCH/ENG:	K. MULLER
PROJECT DATE:	APRIL 2001

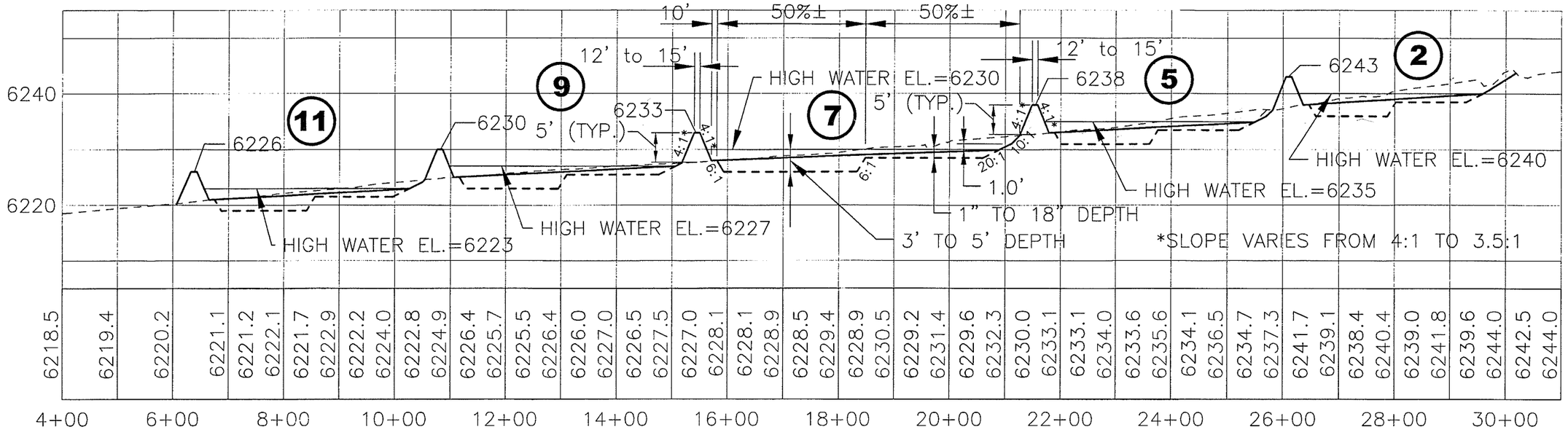
ZUNI WETLAND SITE PLAN

LAGOON RENOVATION AND WETLAND PROJECT
PUEBLO OF ZUNI
ZUNI, NEW MEXICO

C-01

SHEET 2 of 8

WZU-C-01 04/27/01 1"=200' XREFS: ZUNI



F
C-01

GENERALIZED SITE CROSS SECTION

SEE SHEET C-03 FOR DETAILED TYPICAL CELL SECTION

Survey Control Points:

Point No.	Northing	Easting	Elevation
102	-891.68	-1220.31	6248.84
108	1539.46	-884.28	6230.01
109	-424.39	-3060.54	6233.97
110	-1495.47	-4577.32	6224.66
112	1119.23	-4673.22	6212.25
113	2045.69	-3366.72	6219.94

Riparian Stream Control Points:

Point No.	Northing	Easting	Invert Elevation
R-1	29	-423	6246.0
R-2	-83	-660	6245.6
R-3	-198	-901	6245.0
R-4	-213	-1074	6244.9
R-5	-223	-1215	6244.4

Berm Survey Line Control Points:

Point No.	Northing	Easting	Top of Berm Elevation
1-1	-161	-1266	6246
1-2	-29	-1378	6246
1-3	57	-1386	6246
1-4	191	-1313	6246
1-5	258	-1239	6246
1-6	359	-1213	6246
1-7	673	-595	6246
1-8	653	-519	6246
1-9	385	-416	6246

Point No.	Northing	Easting	Top of Berm Elevation
2-1	-1873	-2865	6243
2-2	-1703	-3295	6243
2-3	-1590	-3329	6243
2-4	-1245	-3013	6243
2-5	-829	-2770	6243
2-6	-408	-1832	6243
2-7	-297	-1758	6243
2-8	-251	-1674	6243
2-9	-324	-1427	6243

Point No.	Northing	Easting	Top of Berm Elevation
3-1	674	-873	6241
3-2	823	-1089	6241
3-3	936	-1101	6241
3-4	1086	-768	6241
3-5	941	-602	6241
3-6	670	-501	6241

Berm Survey Line Control Points (cont.):

Point No.	Northing	Easting	Top of Berm Elevation
4-1	-1586	-3359	6238
4-2	-1285	-3538	6238
4-3	-1216	-3542	6238
4-4	-520	-3256	6238
4-5	-482	-3169	6238
4-6	-689	-2430	6238

Point No.	Northing	Easting	Top of Berm Elevation
5-1	-540	-2961	6238
5-2	-265	-2801	6238
5-3	-176	-2507	6238
5-4	-27	-1987	6238
5-5	266	-1761	6238
5-6	303	-1659	6238
5-7	195	-1439	6238

Point No.	Northing	Easting	Top of Berm Elevation
6-1	19	-1949	6234
6-2	198	-2091	6234
6-3	299	-2084	6234
6-4	865	-1787	6234
6-5	1132	-1533	6234
6-6	1150	-842	6234

Point No.	Northing	Easting	Top of Berm Elevation
7-1	-310	-3026	6233
7-2	98	-3256	6233
7-3	208	-3206	6233
7-4	472	-2314	6233
7-5	449	-2226	6233
7-6	292	-2101	6233

Point No.	Northing	Easting	Top of Berm Elevation
8-1	-1116	-3575	6232
8-2	-715	-3809	6232
8-3	-648	-3813	6232
8-4	-264	-3702	6232
8-5	-197	-3583	6232
8-6	-411	-3290	6232

Point No.	Northing	Easting	Top of Berm Elevation
9-1	478	-3439	6230
9-2	662	-3192	6230
9-3	742	-2864	6230
9-4	972	-2460	6230
9-5	913	-2248	6230
9-6	765	-2238	6230
9-7	480	-2017	6230

Berm Survey Line Control Points (cont.):

Point No.	Northing	Easting	Top of Berm Elevation
10-1	-660	-3838	6228
10-2	-137	-4144	6228
10-3	-39	-4123	6228
10-4	531	-3601	6228
10-5	518	-3470	6228
10-6	210	-3320	6228

Point No.	Northing	Easting	Top of Berm Elevation
11-1	568	-3500	6226
11-2	865	-3352	6226
11-3	988	-3325	6226
11-4	1228	-2731	6226
11-5	1024	-1942	6226

Point No.	Northing	Easting	Top of Berm Elevation
12-1	-121	-4295	6222
12-2	293	-4452	6222
12-3	495	-4336	6222
12-4	750	-3963	6222
12-5	914	-3886	6222
12-6	892	-3713	6222
12-7	800	-3614	6222
12-8	762	-3415	6222

Stilling Basin Control Points:

Point No.	Northing	Easting	Top of Berm Elevation
S-1	104	-401	6250
S-2	103	-333	6250
S-3	63	-380	6250

Cell Pipe Coordinates:

Pipe No.	Upstream/Downstream	Northing	Easting	Invert Elevation	Diameter
R/1	Upstream	-211	-1218	6244.60	15"
R/1	Downstream	-176	-1232	6244.20	15"
R/2	Upstream	-228	-1218	6244.60	15"
R/2	Downstream	-258	-1244	6244.20	15"
1/3	Upstream	632	-763	6240.00	12"
1/3	Downstream	699	-771	6239.04	12"
1/5	Upstream	16	-1362	6240.00	12"
1/5	Downstream	8	-1429	6238.30	12"
2/4	Upstream	-1498	-3220	6237.00	12"
2/4	Downstream	-1453	-3270	6236.04	12"
2/5	Upstream	-738	-2382	6237.00	12"
2/5	Downstream	-674	-2404	6236.04	12"
3/6	Upstream	919	-1069	6235.00	12"
3/6	Downstream	965	-1120	6233.63	12"
4/7	Upstream	-305	-2809	6232.00	12"
4/7	Downstream	-241	-2832	6228.82	12"
4/8	Upstream	-548	-3232	6232.00	12"
4/8	Downstream	-521	-3294	6230.93	12"
5/6	Upstream	162	-1773	6232.00	12"
5/6	Downstream	192	-1834	6231.04	12"
5/7	Upstream	-214	-2513	6232.00	12"
5/7	Downstream	-149	-2536	6231.04	12"
6/9	Upstream	383	-2001	6228.00	12"
6/9	Downstream	408	-2064	6227.04	12"
7/9	Upstream	203	-3065	6227.00	12"
7/9	Downstream	269	-3080	6224.89	12"
7/10	Upstream	131	-3232	6227.00	12"
7/10	Downstream	125	-3300	6225.84	12"
8/10	Upstream	-297	-3667	6226.00	12"
8/10	Downstream	-298	-3735	6225.04	12"
9/11	Upstream	672	-2948	6224.00	12"
9/11	Downstream	737	-2968	6223.04	12"
10/12	Upstream	403	-3653	6222.00	12"
10/12	Downstream	443	-3708	6220.63	12"
11/12	Upstream	614	-3438	6220.00	12"
11/12	Downstream	645	-3499	6218.85	12"

Molzen-Corbin & Associates
2701 Miles Road S.E.
Albuquerque, New Mexico 87106
(505) 242-0600
fax (505) 242-0672

KENNETH R. MULLER
NEW MEXICO
12548
REGISTERED PROFESSIONAL ENGINEER
5/24/01

REV NO	REV DATE	DESCRIPTION

PROJECT NUMBER: ZUN 91-11.P20
DESIGNED BY: KM / JSL
DRAWN BY: M/C STAFF
CHECKED BY: KM
KM ENGINEER
PROJECT DATE: APRIL 2001

ZUNI WETLAND
SITE CROSS SECTION
AND COORDINATE POINTS

LAGOON RENOVATION AND WETLAND PROJECT
PUEBLO OF ZUNI
ZUNI, NEW MEXICO

C-02

SHEET 3 of 8

WZU-C-02 04/27/01 1=100